

As recited in independent Claims 1, 10, and 17, embodiments of the present invention perform simultaneous determination of respective scale factors and alignment angles of a multi-axis accelerometer device for measuring acceleration. To measure the scale factors, as recited in the independent claims, a multi-axis accelerometer device to be calibrated is mounted on a turntable. The turntable has a tilt angle with respect to a vertical axis defined by the local gravity vector. The turntable is used to spin the multi-axis accelerometer device around an axis of rotation at an angular velocity such that the multiple sensitive axes of the accelerometer device experience a time varying component of the local gravity vector. The respective outputs of the multiple sensitive axes of the accelerometer device are recorded as the device experiences the time varying component of the local gravity vector.

Specifically, Claim 1 explicitly recites in part:

a) mounting a multi-axis accelerometer device on a turntable in a first orientation, the turntable having a tilt angle with respect to a vertical axis defined by a local gravity vector;

b) spinning a multi-axis accelerometer device around an axis of rotation at an angular velocity using the turn table such that the multi-axis accelerometer device experiences a time varying component of the local gravity vector;

c) receiving respective outputs of the multiple axis as the multi-axis accelerometer device experiences the time varying component of the local gravity vector;

d) repeating steps (a), (b) and (c) with the multi-axis accelerometer device mounted in a second orientation; and,

e) repeating steps (a), (b) and (c) with the multi-axis accelerometer device mounted in a third orientation; and,

f) determining respective scale factors or alignment angles of the multiple axes of the accelerometer device by combining the respective received outputs of the accelerometer device with predicted outputs of

an ideal accelerometer, the predicted outputs based on the tilt angle of the turntable, the angular velocity of the ideal accelerometer, and the local gravity vector.

As recited in Claim 1, the predicted output of an ideal accelerometer on the turntable is generated, wherein the predicted output is based on the tilt angle of the turntable and the angular velocity of the turntable and on the value of gravitational acceleration at the location of calibration. The data recorded with the accelerometer device mounted in the three orientations are combined with the predicted output, to obtain the scale factors and alignment angles of the multi-axis accelerometer device.

In contrast, O'keefe does not show a turn table tilted with respect to the local gravity vector (emphasis added). O'keefe does not show generating predicted output is based on the tilt angle of the turntable and the angular velocity of the turntable and on the value of gravitational acceleration at the location of calibration. These deficiencies are not corrected with the inclusion of Coles. Applicant understands Coles to teach a method for determining azimuth and inclination of a borehole. The combination of Coles and O'keefe do not show a predicted output of an ideal accelerometer on the turntable is generated, wherein the predicted output is based on the tilt angle of the turntable and the angular velocity of the turntable and on the value of gravitational acceleration at the location of calibration. The combination of Coles and O'keefe do not show combining accelerometer data from three orientations with the predicted output, to obtain the scale factors and alignment angles of the multi-axis accelerometer device.

Accordingly, Applicant respectfully submits that the present invention as recited in independent Claims 1, 10, and 17 is not rendered unpatentable within the meaning of 35 U.S.C. Section 103(a) by the Coles and O'keefe references. Since independent Claims 1, 10, and 17 are allowable over the Coles and O'keefe references, Applicant asserts that dependent Claims 2-9, 11-16, and 18 and 19 are allowable over the Coles and O'keefe references.

CONCLUSION

Applicant respectfully submits that all rejections are now overcome and that all claims are now in condition for allowance. The Examiner is urged to contact Applicant's undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

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Respectfully submitted,

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